

Analysis of Galvanic Skin Response: Potential Relationships to Stimulus Responsivity and Brain Dopamine Signal

Evgeny Chumin¹, Daniel Albrecht¹, Karmen Yoder¹

¹Department of Radiology and Imaging Sciences, Indiana University School of Medicine

Fibromyalgia is a chronic pain disorder that presents itself with no apparent medical explanation for the pain. Functional alterations of neurotransmitters such as dopamine (DA) have been implicated in fibromyalgia neuropathology. It is not known how central dopamine function in pain is associated with objective peripheral measurements that are thought to be associated with the presence of pain and stress. Galvanic skin response (GSR), is a physiological measure of nervous system activation. GSR is a simple and non-invasive method that can be used concurrently with other behavioral and physiological tests, and could potentially give insight to novel aspects of dopamine function. In this study, GSR was recorded from fibromyalgia patients (FM) and healthy controls (HC) while they underwent scanning with [¹⁸F]fallypride (FAL) Positron Emission Tomography (PET). FAL is a D₂/D₃ DA receptor antagonist that is sensitive to changes in DA levels in the brain. Given the involvement of DA in cognitive processes, FAL PET can be used to examine baseline DA activity as well as changes from baseline during cognitive load tasks. Each subject received two FAL PET scans under two task conditions (working memory or attentional control). Relationships between GSR and working memory load, acute pain, and DA function were studied and compared between FM and HC. Preliminary analyses have identified putative correlations between DA signal in the brain and GSR levels.

Mentor: Karmen Yoder, Associate Professor, Department of Radiology and Imaging Sciences, Indiana University School of Medicine